Retrospective Study of Leukaemias in Pathology Department of Allama Iqbal Medical College, Lahore

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Retrospective study of 215 leukaemia patients was carried out in the Pathology Department of Allama Iqbal Medical College, Lahore. This study included both acute and chronic leukaemia. Complete blood counts were done on cell dyne and peripheral blood and bone marrow smears were stained with Giemsa as well as special stains which included Sudan Black B, Periodic-Acid Schiff, estrases to see the types and subtypes of leukaemia. Out of 215 cases of leukaemia, 135(63%) cases were acute leukaemia, 80(37%) of chronic leukaemia. Among leukaemias, 69(32%) were acute myeloid leukaemia (AML), 66(30%) were acute lymphoblastic leukaemia (ALL), 64(29%) were CML and 16(9%) were chronic lymphocytic leukaemia. Peak age incidence in ALL was 21ñ16 years, in AML it was 32±19.2 years, 45±10.5 years in chronic myelocytic leukaemia (CML) and 49±15 years in chronic lymphocytic leukaemia (CLL). Sex incidence showed male predominance over female in both acute and chronic leukaemias. The ratio is found to be 4:1 in acute leukaemia and 2.2:1.2 in chronic leukaemia. The types of AML according to the French, American and British (FAB) classification showed 5(7%) of M1, 30(43%) of M2, 17(25%) of M3, 12(17%) of M4, 4(6%) of M5, 2(1.5%) of M6 and 1(1.3%) of M7. In ALL, 16(24%) of L1, 47 (72%) of L2 and 3(4.5%) of L3. Among chronic leukaemia, 64(80%) came of CML and 16(20%) of CLL. In CML, 51(80%) were in chronic phase and 13(20%) were in blast crises. This study showed that ALL is more common in childhood, AML is more in adult group, CML is more common between 31-50 years and CLL in 50-70 years.
Key words: Acute myeloid leukaemia (AML), acute lymphoblastic leukaemia (ALL)

Leukaemias are the malignancies of haemopoietic cells. They can be grouped into acute and chronic forms, both these forms have lymphocytic and myelocytic variety[1,2]. Acute leukaemias are blast cell leukaemias whereas chronic leukaemias involve the more mature cells. Lymphoblastic leukaemias comprise 80% or more of the childhood leukaemias while in adults myeloblastic leukaemias comprise about 80% of the acute leukaemias[3,4]. Chronic myeloid leukaemia is a disease predominantly of middle age[5]. Chronic lymphocytic leukaemia is essentially never seen in children[6,7].

The widely accepted classification of acute leukaemias is the French, American and British (FAB) classification proposed by FAB haematologists in 1976. Their classification is based on morphology of blast cells; ALL has L1-L3 sub-types, whereas AML is classified from M1-M71. Diagnosis of leukaemia is made by peripheral blood examination and bone marrow biopsy. Myeloperoxidase, Sudan Black B and Periodic-Acid Schiff (PAS) are the cytochemical stains used to differentiate between ALL and AML. Further differentiation of leukaemias can be made by cell surface markers and monoclonal antibodies[8].

We report the results of this study carried out to find the disturbance of various types and sub-types of leukaemias in our population.

Material and methods

The study was conducted in Pathology Department of Allama Iqbal Medical College, Lahore from January 1994 to December 1999. Two hundred and fifteen patients of leukaemias were diagnosed. The patients were referred from Jinnah Hospital and WAPDA Hospital, Lahore. The age ranged from 1 to 80 years. These patients were provisionally diagnosed by history and physical examination. Total leucocyte count, platelet count and haemoglobin estimation were done by cell Dyn 400 Haematology analyzer. The peripheral smear of all the patients were stained with Giemsa stain and examined for blast cells. Bone marrow aspirate was performed in all the subjects and smears were stained with Giemsa stain. The classification of cases into various types and sub-types was based on the morphological appearance of blast cells in the bone marrow and peripheral blood, and certain cytochemical stains like Sudan Black B, Periodic-Acid Schiff, chloracetate and alpha-naphthyl acetate estrases (ANAE). These cytochemical stains were performed by kits provided by Sigma diagnostics.

Results

A total of 215 cases leukaemias were studied from 1994-1999. Out of these 135(63%) cases were acute leukaemia, 80(37%) of chronic leukaemias. Among the acute leukaemias, 69(32%) were of acute myeloid leukaemia and 66(30%) were acute lymphoblastic leukaemia. In chronic leukaemias, 64(29%) were chronic myeloid leukaemia and 16(9%) were chronic lymphoid leukaemia (Table 1). The sex incidence showed male predominance on females in acute leukaemias showing 4:1 ratio (Table 1). In AML the mean age was more as compared to ALL (Table 2). It ranged from 1-70 years in both types of leukaemias with mean of 32±19.2 in AML and 21±16 years in ALL,

45±10.5 in CML and 49±15 in CLL. The peak incidence of ALL was between 0-10 years. Acute myeloid leukaemia should highest incidence between 11-30 years. Chronic myeloid leukaemia showed highest incidence between 30-50 years and CLL above 50 years.

Table 1 Sex incidence of leukaemia

Types	Males	Female	n=
Acute myeloid leukaemia (32)	45	24	69
Acute lymphoblastic leukaemia (30)	54	12	66
Chronic myeloid leukaemia (29)	28	20	64
Chronic lymphocytic leukaemia (9)	15	1	16

Table 2. Age incidence of leukaemia

Age (year)	AML	ALL	CML	CLL
1-5	2 (3%)	12 (17%)-		
6-10	14 (19%)	30 (45%)	-	-
11-30	38 (55%)	20 (30%)	16	-
31-50	10 (15%)	4 (8%)	36	2
51-70	3 (4%)	-	12	12
>70	-	-	-	2
Total	69	66	64	16

The types of AML according to the FAB classification showed 5(7%) cases of M1, 30 (43%) of M2, 17 (25%) of M3, 12(17%) of M4, 4(6%) of M5, 2(1.5%) of M6 and 1(1.3%) of M7. In ALL, there were 16 (24%) of L1, 47(72%) of L2, 3(4.5%) of L3 types (Table 3).

Table 3. FAB classification of leukaemia

Types	n=	%age
M1	5	7.0
M2	30	43.0
M3	17	25.0
M4	12	17.0
M5	4	6.0
M6	2	1.5
M7	1	1.3
Acute lymphoblastic leukaemia		
L1	16	24.0
L2	72	72.0
L3	3	40

In chronic leukaemias out of 80 patients, 64 (80%) cases were CML and 16(20%) of CLL. In CML, 51(80%) were in chronic phase and 13(20%) were in blast crisis. (Table 4).

Table 4. Chronic leukaemia

Types	n=	%age
Chronic myeloid leukaemia	64	80.0
Chronic phase	51	80.0
Blast crises	13	20.0
Chronic lymphocytic leukaemia	16	20.0

All the patients of acute leukaemias presented with anaemia haemoglobin level varied from 3-12 g/dl with a mean of 5.0 gm/dl. Total leucocyte count ranged between 10-50x109/L. In chronic leukaemias haemoglobin ranged between 8-12 g/dl. Total leucocyte count was from 50-450x109/l. Blast cells in the peripheral blood varied from 0-80% in AML and 3-95% in ALL. In the bone marrow, there were 35-99% blast cells in AML and 40-99% in ALL (Table 5). Period-Acid Schiff stain was positive in 60(92%) cases of ALL. Block like pattern was present in 30 (45%) of cases. Sudan Black B was positive in 60(87%) and ANAE was positive in 17(25%) cases of AML. Chronic myeloid leukaemia had low neutrophil alkaline phosphatase score ranging from 0-2.

Table 5 Values of peripheral blood and bone marrow (Values in parentheses show the percentages)

	AML	ALL	CML	CLL
Test Hb gm/dl				
<3	6(9.0)	7(10)	2(3)	-
3-6	22(33)	28(41)	12(19)	2(12)
6-12	37(56)	34(49)	50(50)	14(88)
WBC Count 10^9/L				
<5	14(21)	10(14)	3(4.7)	-
5-10	9(14)	8(12)	5(7.8)	1(6)
10-50	23(35)	21(30)	15(23)	5(3.1)
50-99	8(12)	8(11)	11(17)	5(31)
>100	12(18)	12(17)	30(47)	5(31)
Peripheral blood				
No blast cells				
Upto 20%	18(17)	20(28)	11(85)	-
21-50%	14(21)	10(17)	2(14)	(12)
51`-90%	27(75)	25(35)	-	-
Blast in bone marrow				
25-50%	10(21)	13(14)	3(4.7)	-
51-90%	29(44)	33(48)	3(4.7)	-
>90%	27(41)	23(33)	-	-

Discussion

Leukaemias are common malignancies. Acute leukaemias have high incidence and commonest in children (47%), acute lymphoblastic leukaemia is the most common of all the childhood malignancies1. The maximum age incidence of ALL in childhood is 1-6 years. Another study showed peak incidence in 3-5 year[4]. This peak is seen in western countries but is absent in Africa and many developing countries. Our results are similar to those reported by other[9,10]. Acute lymphoblastic leukaemia being the most frequent age group involved in 1-8 years2. Acute myeloid leukaemia is more in adult group, range between 30-50 years. M2 type predominating with 43%. This is in consistence with Whittaker and his associates[8] but is in contrast to a study carried out by Fleischeback et al[3] where M4 type was predominant. M3 type is second (25%) type in the present study which is in consistence with the study carried out by Whittaker et al[8].

Predominance of males in our study (4:1) is in conformity with other reports[1,2]. The likely reason for this male predominance is better care for male child in our society. Acute lymphoblastic leukaemia showed predominance of L2(71%). This is in contrast with the

studies carried out by Bennet et al[10]. and Iftikhar1. This is probably because this study include children as well as adults and in adults, L2 is the common type of ALL. Percentage of the blast cells in peripheral blood varied from 3-96% in AML and 3-91% in ALL. Similar findings were observed by Hoffbrand[11].

The frequency of CML in the present study was 29% with peak incidence between 30-50 years. Whereas CLL was 7.4% with the peak incidence above 50 years. These results were similar as reported by Stephen et al[12]. In CML 80% were in chronic phase and 20% were in blast crises same was also reported by Reiffers et al[5]. Haemoglobin levels were markedly decreased in acute leukaemia more marked in ALL as compared to AML. Total leucocyte count range was 0.5-80x109/L. Same was observed by Stephen et al[12].

This study is based on morphology and cytochemical stains. Latest techniques like immunological markers and cytogenetic studies were not carried out due to lack of facilities. However, it is advisable to carry out these tests as well for confirmation of sub-types of leukaemias.

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